

Claims Status as of May 26, 2006 (revised to October 6, 2006)

1. (currently amended) Apparatus for forming linerless labels from web made of sheet material having a release side and a pressure sensitive adhesive side, which comprises:

belt means for feeding web along a flow path to a cutter assembly, for contouring web in a plane which is transverse to the flow path, and for projecting the web into space toward a cutter;

a cutter assembly, spaced apart from said belt means, for cutting the web repetitively, to form labels; and,

means for receiving said labels from the cutter assembly;

~~wherein, the web is contoured in a plane transverse to the flow path, prior to being cut by the cutter assembly.~~

2. (original) The apparatus of claim 1, wherein said means for receiving labels transports the labels away from the cutter assembly along a continuation of said flow path.

3. (currently amended) The apparatus of claim 2, wherein said means for receiving said labels contours the labels ~~are contoured in a plane transverse to said flow path~~ as the labels are while being transported away.

4. (currently amended) The apparatus of claim 2 further comprising: a source of web in roll form; and, means for delivering web from the roll to the upstream end of the means for feeding web, wherein the means for delivering causes the web to move along a free loop path.

5. (currently amended) The apparatus of claim 3, further comprising said sheet material positioned within the apparatus in the form of web and at least one label, wherein the contour of web and labels is concave when viewed from the release side of the linerless label material.

6. (currently amended) The apparatus of claim 1 wherein said means for feeding comprises at least three spaced apart endless belts running between a set of spaced apart upstream and downstream rollers, for contacting, contouring, and moving contoured web downstream along said flow path; wherein, one of said three belts has having a transverse plane elevation different from the elevation of the other two belts at some point along the flow path.

7. (currently amended) The apparatus of claim ~~6~~ wherein said one belt contacts the lengthwise center of the web without contacting lengthwise regions of the web which are adjacent to said center, ~~feeding means comprises one or more endless belts running between spaced apart rollers; wherein, one belt contacts the lengthwise center of the adhesive side of the web without contacting lengthwise regions adjacent to the center.~~

8. (currently amended) The apparatus of claim 7 wherein the belt means comprises at least two endless belts, each spaced apart from opposing sides of said one belt, and the two belts running between the rollers at a first elevation; wherein the elevation of said one belt changes progressively in the downstream flow path direction from said first elevation at the upstream roller to a second different elevation at the downstream roller. ~~from equal elevation at the upstream end to unequal elevation at the downstream end of the means for feeding, to progressively contour the web as it moves downstream.~~

9. (original) The apparatus of claim 1 wherein said means for receiving and transporting labels comprises at least three spaced apart endless belts running around spaced apart rollers, wherein one belt has a transverse plane elevation different from the elevation of the other two belts, so that labels cut from said contoured web are transported down the flow path in contoured condition.

10. (currently amended) The apparatus of claim 7 ~~or 9~~ wherein ~~said belts move around a the~~ downstream end roller of said means for feeding, where a belt runs, has having a diameter relative to the thickness of each belt sufficient to cause stretching of the outer fiber of each of the belts, and to thereby create breakaway strain on any adhesive bond between the belts and a web being moved along the flow path.

11. (currently amended) The apparatus of claim 1 wherein said means for feeding further comprises:

an upstream roller and a downstream roller; and,

an endless profile belt running around said rollers, for contacting said ~~adhesive side of the~~ web, to ~~thereby move the web along said flow path~~ and to contour the web in a transverse plane;

wherein said profile belt comprises (a) an endless belt base; having ~~(b) a central land; and (c)~~ a pair of spaced apart opposing side wings; wherein the land and wings run, all running along the length of the endless belt base and projecting outwardly from the endless belt base.

12. (currently amended) The apparatus of claim 11 wherein ~~the~~ said wings are continuous along the length of the belt base, wherein ~~so that~~ when the belt contacts and runs around the surfaces of said rollers during use, the wings flatten toward the belt base.

13. (currently amended) The apparatus of claims 7 of 9, further comprising: means for pressing ~~one or more portions of the release side of the web toward at least~~ said one belt, as the web belt moves downstream with the belt web.

14. (currently amended) The apparatus of claim 11 further comprising: means for pressing the lengthwise center portion of the web ~~of the release side of the web toward the~~ central land of the profile belt where it contacts the lengthwise center portion of the web.

15. (currently amended) The apparatus of claim 14 wherein ~~said~~ the means for pressing is a pinch roller having a width greater than the width of the central land of the belt.

16. (currently amended) The apparatus of claim 1 wherein said means for feeding comprises:

an upstream roller and a downstream roller; and,

an at least one endless belt running around the rollers, for contacting the adhesive side of the web, to thereby move the web along said flow path;

wherein ~~at least the downstream~~ one roller has only a pair of spaced apart circumferential rings straddling on either side of the roller region upon which the belt or belts runs, the rings having outside diameters greater than the outside diameter of the surface of the belt or belts where it runs ~~running~~ around said roller.

17. (currently amended) Apparatus for forming linerless labels from material in web form, wherein the web is moved along a web flow path, the material having a release side and a pressure sensitive adhesive side, which comprises:

a cutter assembly, positioned along the web ~~lying along a material flow path~~, for forming labels by cutting of web, which comprises a rotatable cylinder with a knife and an opposing rotatable anvil, wherein there is a cutter gap between the said cylinder and anvil, when the knife is rotated away from proximity to the anvil;

belt means for feeding web along the flow path toward the cutter assembly, and for ~~simultaneously~~ said means ~~contouring the web in a plane transverse to the flow path, said~~ means ~~and moving the contoured web into and through said the cutter gap; and,~~

means for receiving the end of web which is moved into and through said cutter ~~the gap~~ prior to cutting of the web by the cutter assembly, and for transporting labels cut from the web by the cutter assembly along the flow path, away from the cutter assembly in a direction which is a continuation of the web flow path into the cutter assembly, and for delivering the labels to articles for attachment thereto;

wherein the cutter assembly is spaced apart from the belt means for feeding.

18. (currently amended) The apparatus of claim 17 wherein the means for receiving and transporting imparts a linear velocity in the direction of the web flow path to a label which the linear velocities of labels being transported away from the cutter assembly is greater than the linear velocity of web being moved into the gap of the cutter assembly by said means for feeding.

19. (currently amended) The apparatus of claim 18 wherein the cutter assembly cuts only partially through the web ~~thickness material~~; and, wherein the means for receiving and transporting pulls on the web ~~material to tear the remaining material in vicinity of the where the web cut was made, and sufficiently to tear and separate the web at the point of partial cutting, to~~ thereby form the label.

20. (currently amended) The apparatus of claim 18 further comprising web positioned within the apparatus along the web flow path; the web having an adhesive side and a release side; wherein the release side is oriented toward the cutter cylinder and the cutter knife, contacts the release side of web material.

21. (currently amended) The apparatus of claim 17 wherein said feeding means comprises at least three spaced apart endless belts running around a set of spaced apart rollers; ~~wherein, during use the center endless belt contacts a lengthwise center portion of the adhesive side of the web and each of the other belts contacts a lengthwise portion of the adhesive side of the web which portion is spaced apart from said center portion; wherein said contacting comprises temporary bonding of said pressure sensitive adhesive to the belts.~~

22. (currently amended) The apparatus of claim 17 wherein said means for feeding comprises an endless belt running around spaced apart rollers, the belt having a belt base, ~~and a central land and spaced apart opposing side wings;~~ all said central land and wings running along the length of the endless base and projecting outwardly from the base; wherein, when the belt ~~contacts and runs around the surfaces of said rollers during use of the apparatus,~~ the wings flatten toward the belt base.

23. (original) The apparatus of claim 1 wherein the cutter assembly comprises: a rotatable knife; an opposing rotatable anvil; and, means for cooling the anvil.

24. (original) The apparatus of claim 1 wherein the cutter assembly comprises: a rotatable knife cylinder with knife; an opposing rotatable cylindrical anvil in contact with the knife cylinder; and, means for resiliently pressing together the knife cylinder and the anvil, so that cylindrical rotation of either rotates the other by frictional engagement therebetween.

25. (currently amended) The apparatus of claim 24 wherein the cylindrical surface of the anvil which mates with the knife cylinder during rotation of the knife cylinder ~~cutting~~ has a circumference which is different from the circumference of the path of the tip of the knife, so that the knife tip mates with a different circumferential part of the anvil each time the knife cylinder is fully rotated.

26. (original) Apparatus for forming linerless labels from material in web form, the material having a release side and a pressure sensitive adhesive side, which comprises:

means for feeding said web along a flow path toward a cutter assembly; and,

a cutter assembly, for cutting portions from the web to form labels, which comprises a rotatable knife and a rotatable anvil having means for interior cooling.

27. (currently amended) Apparatus for forming labels from web comprising:

a source of label material in web form, the web having spaced apart indicia ~~which are readable by a sensor~~;

means for feeding said web along a flow path toward a means for cutting;

means for cutting said web to form labels;

means for receiving said labels from the cutting means~~cutter assembly~~;

a first sensor, positioned downstream of the cutting means, for sensing ~~reading~~ indicia lengths;

means for comparing lengths of ~~portions of an indicium which is~~ indicia which are severed during forming of a label, based on first sensor reading information; and,

means for adjusting the length of a subsequent label, according to how the difference in lengths of an the indicium which is severed during the forming of a label. ~~portions relate to each other or to a desired reference standard.~~

28. (currently amended) Apparatus for forming labels from web comprising:

a source of label material in web form, the web having two sets of spaced apart indicia which are sensible by a sensor, the indicia sets arranged relative to each other to provide lengthwise spaces S between an indicia pair comprised of first set indicium and a second set indicium; ~~spaced apart staggered sets of indicia which are readable by a sensor, the degree of stagger sufficient to provide lengthwise spaces S on the web between indicia pairs of each set;~~

means for feeding said web along a flow path toward a means for cutting;

means for cutting said web to form labels;

means for receiving said labels from the cutter means~~assembly~~;

a first sensor, positioned downstream of the cutting means, for ~~reading~~ sensing indicia lengths on the labels;

means for comparing the length of each indicia of a said indicia pair, as measured by the first sensor, with the predetermined known lengths of each indicia which on the web prior to cutting of the label; and, wherein said first sensor reads the presence or absence of whole indicia on a label or web end just formed by cutting of said web; and,

means for adjusting the length of the web which is subsequently cut into a label when a sensed length is less than said predetermined known length, ~~according to whether not the first sensor detects any indicium has been cut.~~

29. (currently amended) The apparatus of claim 27 or 28 wherein ~~the said~~ means for adjusting comprises changing the amount of web which is fed along the flow path between the cutting of one label and the cutting of a next ~~prior to cutting of a label.~~

30. (original) The apparatus of claim 27 or 28 wherein the means for cutting comprises a rotary knife cylinder and mating anvil; and, wherein the means for adjusting comprises changing the speed or timing of rotation of the knife cylinder.

31. (original) The apparatus of claim 27 wherein the label length is changed according to whether or not there is equality in length of portions of any severed indicium.

32. (currently amended) In an apparatus having a feeder which feeds web into and through the gap of a cutter which is spaced apart from the feeder, so the cutter can form labels by cutting the web into portions, wherein the feeder causes an end of the web to cantilever outwardly from the feeder and extend portions from the web which cantilevers from the end of a feeder through said gap, the improvement which comprises: contouring the web in a plane which is transverse to said flow path, to increase the stiffness of the cantilevered portion of the web.

33. (cancelled)

34. (withdrawn, currently amended) A method of forming linerless labels from web made of material having a release side and a pressure sensitive adhesive side, and applying said labels to articles, which comprises:

feeding web along a web flow path toward a cutter, so the end of the web extends through and beyond the cutter, while

contouring the extended end of the web cutter in a plane transverse to the flow path while feeding the web, to provide stiffness to the web;

repetitively cutting the extended end of the web, to form ~~for forming~~ labels;

~~receiving and transporting said labels further along the flow path, away from the cutter and toward articles to be labeled, while the labels are contoured in a plane transverse to the flow path; and;~~

~~projecting the ends of said contoured labels from the downstream end of the means which receives and transports labels, so the ends of thereof contact and adhere to moving articles.~~

35. (withdrawn) The method of claim 34 wherein web is partially cut through in the cutting step; and wherein the receiving and transporting step causes the remainder of the web to tear, to thereby form the label.

36. (cancelled)

37. (cancelled)

38. (currently amended) A method of applying linerless labels to articles, wherein the labels each have an adhesive side and a release side, which comprises: contouring a label so the release side of the label is contoured and made concave; projecting an end of the concaved label toward an article, so the label end contacts the article and so the adhesive side adheres to the article; and, ~~releasing the label from the means which projected the label toward the article; and, adhering the rest of the label to the article.~~

39. (new) The apparatus of claim 9 wherein the downstream end roller of said means for receiving, where a belt runs, has a diameter relative to the thickness of each belt sufficient to cause stretching of the outer fiber of each of the belts, and to thereby create breakaway strain on any adhesive bond between the belts and a web being moved along the flow path.